

A GUIDE TO HUMAN FACTORS CONSIDERATIONS

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This pamphlet works in concert with AFRD 91-2, *Safety Programs* and is intended as a quick reference to human factors considerations in day to day flight and ground operations. It is meant to get commanders thinking and give them some possible solutions to common problems. If you have any recommendations or would like to see any additions to this pamphlet please contact the OPR.

Section A -- Introduction

1. Human Factors. The Air Force Safety Center defines Human Factors as “The discipline of optimizing the relationship between people and their activities by the systematic application of the human sciences, integrated within the framework of systems engineering.” In layman’s terms: the physiological, psychological, and social interactions between a person, their tools, coworkers, and their environment that enable them to get their jobs done successfully.

2. Why look at Human Factors? Human Factors failures have been attributed to most accidents, from hitting your thumb with a hammer to crashing airplanes. A phrase common to many TDY and flight briefings is “watch out for each other.” This guide will give you some things to actually watch out for. Regarding mission accomplishment, Human Factors can be looked at as a threat, much like a surface to air missile or a terrorist attack. This guide breaks the threats into three major categories, physiological, psychological and social, and gives a brief look at the threats. It also gives you some countermeasures to mitigate the threats. Once you know the threats and the countermeasures you still have to evaluate the risks. Operational Risk Management (ORM) will help you evaluate the risks. The final portion of the guide will be an ORM overview.

3. Further Information. For more in-depth research, talk to your wing or group safety experts or check the more detailed manuals. There is a list of references at the end of the guide that will be helpful.

Section B -- Physiological

4. Fatigue:

4.1. Being fatigued, or tired, can come from a number of sources. You can be mentally or physically fatigued or both. It can be due to sleep deprivation, jet lag, or numerous consecutive max effort days. Fatigue can either lead to its own set of threats or contribute to the severity of other threats such as inattention, shortened attention span, slow reaction, complacency, or task saturation. Micro-sleeps, or falling asleep on the job for short periods of time, can be disastrous during critical phases of flight or maintenance. There are many stories of people falling asleep at the wheel and of aircrews waking up to find they are over the ocean instead of landing at a coastal city. High Ops Tempo, long deployments, and deployments crossing many time zones are major contributors to high fatigue levels.

4.2. Signs of fatigue range from the obvious, yawning, difficulty holding your head up, the bob and weaves, to the not so obvious such as staring off into space. Other outward signs are erratic flight or driving control, flight and driving path deviations, or forgetfulness. Change of mood is also a sign; is the person uncharacteristically argumentative, irritable, or apathetic? Decreased physical activity and “self-removal” from social interaction may also be indicators. Fatigue and sleep deprivation can also lead to delusions in extreme cases.

4.3. An important point to remember is people don't always realize they are fatigued. They believe they are fully alert and capable, this is further exacerbated if the person is using stimulants to combat fatigue. Because of an individual's inability to recognize they are fatigued it is imperative supervisors and commanders watch for signs of fatigue. It is also up to commanders to forestall fatigue effects by setting up adequate rest schedules to guard against fatigue and sleep debt in the first place.

4.4. Countermeasures. Start by staying ahead of the game. Keep physically fit, eat high protein foods and drink lots of water. Caffeinated beverages can *temporarily* enhance alertness, but just be careful when the caffeine runs out. Use of alcohol as a sleep aid needs to be avoided. Studies have shown that alcohol can effect the body for up to 72 hours after ingestion. Get proper rest prior to going to work. Shift your sleep cycles if need be. Another option, with the concurrence of proper medical and command authority, is the use of stimulants and sleep aids. Exercise leadership! If you or your crew or people working for you don't seem ready to go, then don't make them.

4.5. A number of things can be done to overcome fatigue on the job. For example, talk with other workers or crewmembers; get away from the task for a few minutes. Share the workload. Double-check the each other's work. Bring a good lunch or snack with you, such as a sandwich and or vegetables. Take controlled naps on those long days. Studies by the FAA and NASA have found that pilots taking “strategic naps” on long overwater flights made fewer errors during the approach and landing phases than pilots who were

not allowed to nap (Rosekind, 1996). Finally realize that the only permanent fix to fatigue and sleep deprivation is a good night's sleep.

5. Circadian Rhythm and Shift Work:

5.1. Circadian rhythms are daily cycles of all body functions. The cycle that usually comes to mind is the sleep cycle. Without the normal environmental cues such as sunrise etc. an individual's sleep cycle tends to last 25 hours from the time he wakes up one day to the next. Disrupting this cycle due to deployments (jet lag), rotating shift work and sleep deprivation can lead to fatigue and its associated problems. "The effects of disturbing the circadian rhythm can be significant. One investigation showed that the ability to operate a flight simulator at night, when compared to normal daytime pilot proficiency, decreased to a level corresponding to that after moderate alcohol consumption" (Fairclough, and Graham, 1999).

5.2. The rule of thumb for shifting time zones is one day of recovery time for each time zone transited. So going from Hurlburt Field to Brindisi should take about a week of recovery time. Generally we don't have the luxury of having these days off when we deploy, but there are ways to accelerate the adaptation process.

5.3. Countermeasures. Gradually shift sleep schedules an hour or two per night prior to departure. If adjusting after the trip, intense light in the morning has been shown to promote phase advances (Pinal 1997). A good workout early in the morning the first day after an east-bound flight can also help you adjust more quickly. For shift work, rotate shifts at 2-week intervals to let the workers slowly acclimate to the change. Also rotate shift workers from their current shift to one later in the day, this takes advantage of the body's natural 25-hour clock. If you are shifting to a night cycle, try to get to bed before the sun comes up; the sun tends to reset your body clock.

6. Spatial Disorientation:

6.1. Spatial disorientation is an incorrect perception of one's linear and angular position and motion relative to the plane of the earth's surface. Basically, one feels the aircraft is doing something that it isn't. Often the pilot tries to erroneously correct what he feels is happening and gets into trouble. It is important to remember that *all* pilots are susceptible regardless of experience or proficiency. Spatial Disorientation tends to occur mainly during night and IMC flights but can also happen during VMC. There are 3 types of disorientation, referred to remarkably enough as, Type I, Type II, and Type III. Type I is unrecognized spatial disorientation. The pilot is unaware that anything is wrong and controls the aircraft in response to false sensations. Type II is recognized disorientation. The pilot knows something is wrong but may not realize the source of the problem is spatial disorientation. Type III is incapacitating spatial disorientation. The pilot knows something is wrong but is unable to recover the aircraft. Some things that exacerbate spatial disorientation are stress, fatigue, hypoxia, certain medications, alcohol, task saturation, inexperience, and lack of proficiency.

6.2. Countermeasures. The best countermeasure is training! Know what spatial disorientation is and what can cause it. Next, trust your instruments and establish visual dominance; trust your eyes not the seat of your pants. Let your fellow crewmembers know what you are experiencing. Maintain your instrument cross checks. Minimize stressors and divide the workload among the crew. If you can't make the instruments read right, transfer aircraft control to the other pilot. When flying in formation, make sure your people are proficient. Try to avoid climbing or turning rejoins. If weather starts to deteriorate go to IMC procedures.

7. Thermal Stress:

7.1. Temperature extremes, whether they are hot or cold, can cause problems for individuals. Extreme temperatures can cause people to lose motivation and accomplish tasks quickly to avoid the unpleasant environment. Cool temperatures can lead to hypothermia with associated degradation of cognitive function. Most hypothermia cases develop in air temperatures of 30 to 50 degrees Fahrenheit and the onset can be very rapid. Heat can lead to cognitive and physical problems such as heat stroke, heat exhaustion, and dehydration as well.

7.2. Hypothermia, or decreased body temperature, can serve as a major distracter and have a severe impact on motivation. When people get cold there tends to be an overwhelming desire to get warm to the exclusion of all else. This desire will lead to people doing anything to get to a warm place, including hurrying through checklists and cutting corners on tasks. To compound the hurrying problems, decreased manual dexterity, memory lapses, and impaired judgement are also common with hypothermia. Impaired judgement often causes the hypothermic person to not realize they are impaired. It is more important to trust the symptoms rather than the person. Symptoms include violent shivering, memory lapses, incoherence, slurred speech, stumbling, and exhaustion.

7.3. Heat exposure can lead to fatigue with all its effects. Excessive dehydration due to sweating can be a factor. Dehydration can lead to a number of both physical and cognitive problems. On the physical side, it can cause reduced capacity for manual work and muscle cramps. Cognitively it can lead to increased reaction times and illogical thought patterns. In extremely dry climates, such as a desert or at high altitudes, it is possible to dehydrate without realizing it because of the rapid evaporation of sweat and lack of moisture in the air.

7.4. Countermeasures. For both hot and cold limit exposure as much as possible limit time working in extreme temperatures. Set up work schedules with rest periods in a climate controlled environment; bioenvironmental personnel can help you determine the proper schedules. Work in pairs using the buddy system. Be alert for signs of fatigue during hot and cold weather. Consider using air conditioning units to cool aircraft as they are being worked on in hot climates. Make provisions for cooler clothing during hot temperatures. Allow troops to take off BDU tops or to preflight in shorts and t-shirts. When combating hypothermia increase fluid and caloric intake to replace energy

expended in the body keeping itself warm. Use heaters during cold weather and wear hats in cold weather, 75% of body heat escapes through the head and neck.

7.5. For dehydration, supervisors should ensure their troops drink early and often. National Institute of Occupational Safety and Health (NIOSH) recommends 5 to 7 oz every 20 minutes. Drink before you hit the flight line whether to work or go to fly. Keep water convenient to people at the work site. Stress the importance of drinking before you are thirsty. Adding a little flavor to the water helps increase the amount a person drinks. Avoid sweet drinks like Kool-Aid; many doctors recommend Gatorade mixed at half the strength on the label.

8. Night Vision Goggles (NVGs):

8.1. Night vision goggles are a permanent fixture in AFSOC Operations. NVGs are excellent aids, but have some inherent problems due to decreased visual acuity, decreased depth perception, and decreased field of view.

8.2. Due to technical limitations the best visual acuity achievable when using ANVIS-6 or ANVIS-7 NVGs is 20/40. The new 4949 NVGs have better resolution, but it still isn't 20/20 vision. The important point to remember is that the best resolution is obtained only when the NVGs are *properly* focused and preflighted. A number of studies in the past suggest that aircrew are bad at focusing properly (Biberman and Alluisi, 1992) so crews are out there not 'seeing all that they can see.'

8.3. Distance estimation errors are also a problem due to decreased depth perception cues. Because people are looking at two small TV screens instead of through tubes as in glasses there is a loss of binocular depth perception cues and some monocular cues. The problem is even more pronounced with ANVIS-7 goggles because there is only one image gathering lens that splits the image so you view exactly the same image with both eyes.

8.4. Limited field of view (FOV) presents its own problems. Besides the obvious "looking at the world through toilet paper rolls", closure rates and speeds are harder to determine when wearing NVGs. This is because people get most velocity cues from their peripheral vision. The small FOV doesn't allow the eye to gather information from the periphery as it does normally.

8.5. Countermeasures. Perhaps the most important thing to remember is to properly preflight and adjust your NVGs prior to stepping to the aircraft. Procedural questions can be directed to your life support shop. To compensate for limited FOV increase your scan pattern and head movements. Finally, be aware that your depth perception and perception of closure rate is not what it is normally because of the design limitations of the NVGs.

Section C -- Psychological

9. Attention. There are 4 types of attention: selective, focused, divided, and sustained. Selective attention requires monitoring of several sources of information to perform a single task, such as driving a car. Focused attention involves concentrating on one source of information in a noisy environment, like trying to read a T.O. or job card with other people asking questions or trying to chat. Divided attention is when you are trying to do two or more separate tasks at the same time, such as flying a helicopter while searching for something outside the aircraft. Finally, sustained attention involves doing a task over a long period of time, such as monitoring a radar screen or flying orbits. The main problem associated with sustained attention is boredom, especially when target events rarely occur.

10. Attention's Limited Resource Pool:

10.1. Although experts disagree on how cognitive abilities are distributed, be it a "single source pool" or "multiple pools", they all agree that there is a finite limit to the amount of attention one can pay (Wickens, 1992). They also agree that there are individual differences in the resources available. Some folks can walk and chew gum at the same time; others can't. The important thing is to realize that there is only so much attention to invest. It can be spent all on one item, ending up with tunnel vision, or spread around between tasks. Realize that a person can't really do two tasks at once. In reality, the mind is very efficient at rapidly switching between tasks. As you become fatigued your mind tends to be less efficient at switching between tasks. This can cause focusing attention on one item alone or switching slowly between tasks thus affecting situational awareness.

10.2. As capacity is overloaded, or the resource pool drained, things tend to break down. Crews end up with tunnel vision, or channelized attention, such as Eastern Flight 401, which crashed in the Florida Everglades while trying to repair a burnt out landing gear light bulb. Take for example talking on the cell phone while driving. Studies have shown that manually dialing the phone while driving results in increased lane deviations, increased reaction time, and a reduction in situational awareness (NHTSA, 1999), while simply talking on the phone only decreases situational awareness.

10.3. Countermeasures. Try to limit the competition for resources. Limit the number of, or delegate tasks. Recognize that extra conversation at times can be a distracter. Limit conversation to crew duties during critical phases of flight and maintenance. Avoid task saturation by explicitly assigning tasks to people in your work team, be they an aircrew or maintenance team. Set priorities and stick to them: aviate, navigate, communicate. Have someone designated as a person to check work. Have individuals double-check their own work as a last resort, but it is better to get a fresh set of eyes on the problem, especially if people are fatigued. If people have become distracted or gotten pulled out of a checklist before they are finished, have them go back 3 steps on the checklist or start all over again. Head's down tasks such as paperwork, reduce the ability to monitor a coworker. Schedule heads down items for non-critical times; complete the write up after the task is complete.

10.4. For sustained attention, break the monotony. Ask questions, talk through emergency procedures, scan all the instruments and don't stare at individual instruments. If it is possible, people engaged in sustained attention tasks should take breaks every 30 minutes or so. Switch tasks if practical; don't spend all day everyday doing the same thing.

11. Decision-making:

11.1. According to decision making models (Wickens, 1992) there is a basic process for making decisions. The decision-maker gets cues from the outside world, which may or may not be reliable, related to what is really going on in the world. The decision maker then samples and integrates the information, assigns a probability and makes a decision as to what will happen, what is going on, or what will happen in the future and what course of action to take. The result of the course of action serves as feedback to the decision-maker and goes into their mental database for future decision making.

11.2. Decision making problems are different based on the experience levels of people involved. Inexperienced people, by definition, don't have the database on which to make sound decisions. Either not understanding the probabilities of an outcome or knowing which courses of action to take in given circumstances are lacking. Experienced decision-makers have a different set of pit falls. They tend to over rely on their experience, "if they haven't seen it in their 15 years of wrench turning it don't exist". They also tend only to look at information that confirms their decision to the exclusion of other pertinent data possibly missing what is really going on.

11.3. Countermeasures. Crew and shift composition *and* organizational atmosphere are critical here. It is important to schedule older experts as mentors to the newer, inexperienced personnel to spread knowledge. Organizational atmosphere becomes critical in that the new folks must be made to feel they can question the older experts. If there isn't a free exchange of information, "copilot syndrome", which is explained below, crops up. The experts can impart their years of experience to the new folks and the new folks can help by asking questions the experts may have discounted, but may really be important. A formalization of the decision making process such as operational risk management can also help the inclusion of pertinent data and possible courses of action the expert might have missed or discounted.

12. Reverting to Old Habit Patterns:

12.1. Whenever people change from working on one system to another there is a chance for negative transfer: reverting to old habit patterns. The most problematic situation is when you have similar situations (aircraft) that require different responses.

12.2. Errors will most likely come from two sources, “skill based behaviors” or “rule based behaviors.” Skill based behaviors are the type we don’t have to think about; we just do it reactively. Steering and speed control of a car is a good example. Rule based behaviors involve applying rules to known non-unique situations. One tends to have to think about these behaviors at first but they tend to become reactive after a while, such as driving on the left or right hand side of the road or making right turns on red. The rules are easy but aren’t universal. Rule based errors usually occur when you don’t have time to think or are fatigued. For example, you are driving in England after just arriving on a deployment. You are fatigued, but doing ok driving on the left. You are turning at an intersection. Traffic is bad. Horns start honking. You see a gap and turn, and because you’re flustered, you instinctively head for the right lane, into oncoming traffic.

12.3. Countermeasures. If people have to swap between different systems try to make the systems different. For example, you have a different response to the same situation between the systems. When a light illuminates on system A, you move a lever up. On system B you have to move the lever down when the light illuminates. To avoid reverting to old behavior, make the levers different sizes or shapes as a cue to the individual to do something differently.

Section D -- Social

13. Social Factors. This section deals with perceptions and can be greatly effected by organizational climate and management. Leadership plays a key role as to how far people “lean forward” to get the mission done. Leadership needs to be careful as to what kind of behaviors they reward and punish, and what kinds of behavior they don’t reward and punish.

14. Pressure to Get the Mission Done:

14.1. The mission is why we are here. Get the mission done! But, at what cost and what risk? The answer is situational, it depends on circumstances; war, training, or peace. Generally in our business, with the people we have, there is an intrinsic push to get the mission done any way possible. This may mean cutting corners to some, or pushing beyond one’s limits. Pressure can also come from outside the individual. It can come from commanders, based on the perception of what the commander wants. Succumbing to this pressure to go beyond ones limits and cutting corners can be deadly.

14.2. Countermeasures. Make sure commanders intentions and guidance are clear. This can be done in briefings or the form of a letter. Many commanders have published “When to lean forward” letters. These are good for setting guidelines for the people in the command. The importance of following tech orders and regulations and not cutting corners should also be stressed.

15. Co-pilot Syndrome:

15.1. This usually occurs when there is an inexperienced person paired with a highly experienced person. Although it is put in terms of flight, it can happen in maintenance as well. The syndrome is characterized by the more experienced person making a mistake and the less experienced person not speaking up. The less experienced person figures that the experienced person knows something that they don't, so they go along with it. An example could be a 7 level forgetting to safety wire a switch and a 3 level not questioning the omission.

15.2. Countermeasures. The more experienced person needs to make the point that although they are experienced, they are not infallible. They need to encourage the inexperienced person to bring up any questions they have, and then not get angry when they do. The less experienced person needs to ask questions; you never know when that question may save an injury, a life, or valuable resources.

16. Family Concerns Compete for Resources:

16.1. This subject impacts attention and the limited resource pool. If there are problems away from work, no matter how good people think they are at compartmentalizing them, the problems can and will spill over at some point. Then, when doing what is normally a routine task, your mind could wander and miss a critical step.

16.2. Countermeasures. The best thing to do is to step back and correct the basic problem. There are many places one can turn depending on the problem. The family support center, base legal services, medical services, or Chaplains are excellent places to start. While deployed the squadron could set up a squadron wives network, and rear echelon commander, establish "call anytime" numbers for home repairs etc. These go a long way to establish "peace of mind" for those deployed.

17. Get-home-itis:

17.1. Everyone at one point probably experiences this. The overwhelming desire to push the crew day or through a maintenance problem to get back to home station. This can either be caused by long TDYs or extenuating circumstances such as family problems. Often this pushing causes people to once again go beyond their capabilities.

17.2. Countermeasures. Be disciplined! A couple of hours or a day later is better than not coming back home at all. Leadership has to emphasize the importance of safety over getting home. Look at what could cause the overwhelming desire to get home, such as family problems, and eliminate the source.

18. Hurry up Syndrome:

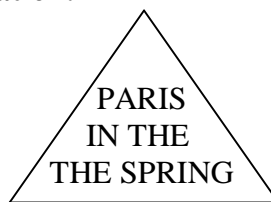
18.1. The crew is running behind for take off or slightly behind running checklists for the airdrop. Things are getting close but if the crew just works a bit faster you can get the take off or make the airdrop. Everyone ends up racing through, possibly missing steps on the job card or checklist. Crewmembers could end up on different checklists or calling for an airdrop before all the checks are complete.

18.2. Countermeasures. Follow the checklists. Plan in a little extra time if possible. Try to eliminate the perception that on time take-offs are more important than correct completion of tasks.

19. Complacency:

19.1. Complacency occurs when the same routine is followed over and over. This can be flying the same route or performing the same task, day in day out. When this happens a person develops expectations as to what will happen next. These expectations may not be what you actually have. Read the triangle below:

Figure 1. Complacency Demonstration:



What did you read? What is really there? We've all been reading for years and developed expectations about reading; you don't expect the second *the* so you tune it out, but it is still there. You just missed it as with many unexpected things when you become complacent.

19.2. Countermeasures. Vary the routine or assign people different tasks as practical. Vary the low-level routes and profiles your unit flies. This should also help with realistic training.

Section E -- Operational Risk Management**20. Basic Risk Management Principles:**

20.1. Four principles govern all actions associated with risk management. These continuously employed principles are applicable before, during and after all tasks and operations.

20.1.1. Accept no unnecessary risk. An unnecessary risk jeopardizes mission success and lessens the opportunity to maximize potential benefits. The most logical choices for accomplishing a mission are those that meet all mission requirements with the minimum acceptable risk.

20.1.2. Make risk decisions at the appropriate level. Making risk decisions at the appropriate level establishes clear accountability. An appropriate decision-maker is authorized to accept levels of risk typical of the planned operation (i.e., loss of mission effectiveness, normal wear and tear on materiel). They are also required to elevate decisions to the next level in the chain of command after it is determined that the controls available to the decision-maker will not reduce residual risk to an acceptable level.

20.1.3. Accept risk when benefits outweigh the costs. All identified benefits should be compared to all identified costs. The process of weighing risks against opportunities and benefits helps to maximize unit capability.

20.1.4. Integrate RM into planning at all levels. To effectively apply risk management, commanders must dedicate time and resources to incorporate risk management principles into the planning processes.

20.2. ORM consists of 5 Basic steps; identify the risk, assess the risk, decide what your risk control options are, decide which control measures you'll use and implement them, and supervise and review the process. The risk level constantly changes throughout the mission. Whether in planning or as the mission is executed, the person in command needs to decide certain things. What are the most harmful threats? How are they going to be mitigated? The commander then implements the decision from the previous step. Finally the commander reviews the process to ensure it is being correctly carried out.

20.2.1. First identify the risk. Use tools such as task analysis, brain storming, scenario, or "what if" etc. to figure out what can hurt you or your mission.

20.2.2. Next assess the risks you've found. Risk is determined by probability of occurrence vs. severity of outcome, as shown in Table 1.

20.2.3. Decide which control measures to take and then implement them.

20.2.3.1. Reject. We can and should refuse to take a risk if the overall cost of the risk exceeds its benefits.

20.2.3.2. Avoid. Avoiding risk altogether requires canceling or delaying the job, mission, or operation, but is an option that is rarely exercised due to mission importance.

20.2.3.3. Delay. It may be possible to delay a risk. During the delay, the situation may change and the requirement to accept the risk may go away.

Table 1. Risk Assessment Matrix.

			Probability				
			Frequent	Likely	Occasional	Seldom	Unlikely
			A	B	C	D	E
S E V E R I T Y	Catastrophic	I					
	Critical	II			High		
	Moderate	III					
	Negligible	IV					Low
			Risk Levels				

NOTE: Definitions for the above table are as follows:

SEVERITY

Catastrophic – Complete mission failure, death, or loss of system

Critical – Major mission degradation, severe injury, occupational illness or major system damage

Moderate – Minor mission degradation, injury, minor occupational illness, or minor system damage

Negligible – Less than minor mission degradation, injury, occupational illness, or minor system damage

PROBABILITY

Frequent – Individual/Item. Occurs often in career/equipment service life. Everyone exposed. Continuously experienced.

Likely – Individual/Item. Occurs several times in career/equipment service life. All members exposed. Occurs frequently.

Occasional – Individual/Item. Occurs sometime in career/equipment service life. All members exposed. Occurs sporadically, or several times in inventory/service life.

Seldom – Individual/Item. Possible to occur in career/equipment service life. All members exposed. Remote chance of occurrence; expected to occur sometime in inventory service life.

Unlikely – Individual/Item. Can assume will not occur in career/equipment service life. All members exposed. Possible, but improbable; occurs only very rarely.

20.2.3.4. Transfer. The possible losses or costs in this case are shifted to another entity.

20.2.3.5. Spread. Risk is commonly spread out by either increasing the exposure distance or by lengthening the time between exposure events.

20.2.3.6. Compensate. Create redundant capabilities. An example is to have a backup plan.

20.2.3.7. Reduce. A proven order of precedence for dealing with hazards and reducing the resulting risks is:

20.2.3.7.1. Plan or Design for Minimum Risk. Design the system to eliminate hazards.

20.2.3.7.2. Incorporate Safety Devices. Reduce risk through safe guards: an automobile seat belt doesn't prevent a collision but reduces the severity of injuries.

20.2.3.7.3. Provide Warning Devices.

20.2.3.7.4. Develop Procedures and Training. Specifically select people for the job and train them on the associated hazards.

20.2.4. Decide on the best course of action to mitigate (control) the risks and implement the decision.

20.2.5. Finally use situational awareness to monitor your decisions; are the controls you've implemented effective? Do your controls lead to new risks? You may need to assess new risks and start the cycle over.

Section F -- Conclusion

21. Conclusion. The bottom line is, the threats are out there! The more people know about them, the better off they will be. Knowing the threats and countermeasures for them will help to avoid accidents. ORM will help you identify, assess, implement, and manage the risks. This guide is a good start along the path to determine what is out there that can hurt you. But, it is not the be all and end all. We can't cover every possible situation and people will have to use their own judgement. Commanders and individuals must be aware of the risks and manage them smartly.

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Director of Safety

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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